

SEQUENCE LISTING

<110> Cases, Sylvaine
Stone, Scot
Zhou, Ping
Farese, Robert V.
Chi-Liang Eric Yen

<120> MONO- AND DIACYGLYCEROL ACYLTRANSFERASES AND METHODS OF USE THEREOF

<130> UCAL240CIP

<140> Unassigned
<141> 2002-01-14

<150> 60/271,307
<151> 2001-02-23

<150> 09/794,715
<151> 2001-02-26

<160> 18

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 1231
<212> DNA
<213> Homo sapiens

<400> 1
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atggggcact ggatccagca tcctctccgc cctccaggac ctcttctctg tcacctggct 180
caataggtcc aagggtgaaa agcagctaca ggtcatctca gtgctccagt gggtcctgtc 240
cttcttctgt ctgggagtgg cctgcagtgc catcctcatg tacatattct gcaactgattg 300
ctggctcatc gctgtgctct acttcacttg gctgggtgtt gactggaaca caccaagaa 360
aggtggcagg aggtcacagt gggtcgaaa ctgggctgtg tggcgctact ttcgagacta 420
ctttcccatc cagctgggtga agacacacaa cctgctgacc accaggaact atatctttgg 480
ataccacccc catggtatca tgggcctggg tgccttctgc aacttcagca cagaggccac 540
agaagtgagc aagaagttcc caggcatacg gccttacctg gctacactgg caggcaactt 600
ccgaatgcct gtgttgaggg agtacctgat gtctggaggt atctgcctg tcagccggga 660
caccatagac tatttgcttt caaagaatgg gagtggcaat gctatcatca tcgtggctcg 720
gggtgcggct gagtctctga gctccatgcc tggcaagaat gcagtcaccc tgcggaaccg 780
caagggtctt gtgaaactgg ccctgcgtca tggagctgac ctggttccca tctactcctt 840
tggagagaat gaagtgtaca agcaggtgat cttcgaggag ggctcctggg gccgatgggt 900
ccagaagaag ttccagaaat acattggttt cgcctcatgc atcttccatg gtcgaggcct 960
cttctctctc gacacctggg ggctgggtgcc ctactccaag cccatcacca ctgttggtgg 1020
agagcccatc accatcccca agctggagca cccaaccag caagacatcg acctgtacca 1080
caccatgtac atggaggccc tgggtgaagct cttcgacaag cacaagacca agttcggcct 1140

caccatgtac atggaggccc tggatgaagct cttcgacaag cacaagacca agttcggcct 1140
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 aaccagtgc aaatcacttt ttgctctgt a 1231

<210> 2
 <211> 388
 <212> PRT
 <213> Homo sapiens

<400> 2
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 1 5 10 15
 Gln Ala Glu Ala Asp Arg Ser Gln Arg Ser His Gly Gly Pro Ala Leu
 20 25 30
 Ser Arg Glu Gly Ser Gly Arg Trp Gly Thr Gly Ser Ser Ile Leu Ser
 35 40 45
 Ala Leu Gln Asp Leu Phe Ser Val Thr Trp Leu Asn Arg Ser Lys Val
 50 55 60
 Glu Lys Gln Leu Gln Val Ile Ser Val Leu Gln Trp Val Leu Ser Phe
 65 70 75 80
 Leu Val Leu Gly Val Ala Cys Ser Ala Ile Leu Met Tyr Ile Phe Cys
 85 90 95
 Thr Asp Cys Trp Leu Ile Ala Val Leu Tyr Phe Thr Trp Leu Val Phe
 100 105 110
 Asp Trp Asn Thr Pro Lys Lys Gly Gly Arg Arg Ser Gln Trp Val Arg
 115 120 125
 Asn Trp Ala Val Trp Arg Tyr Phe Arg Asp Tyr Phe Pro Ile Gln Leu
 130 135 140
 Val Lys Thr His Asn Leu Leu Thr Thr Arg Asn Tyr Ile Phe Gly Tyr
 145 150 155 160
 His Pro His Gly Ile Met Gly Leu Gly Ala Phe Cys Asn Phe Ser Thr
 165 170 175
 Glu Ala Thr Glu Val Ser Lys Lys Phe Pro Gly Ile Arg Pro Tyr Leu
 180 185 190
 Ala Thr Leu Ala Gly Asn Phe Arg Met Pro Val Leu Arg Glu Tyr Leu
 195 200 205
 Met Ser Gly Gly Ile Cys Pro Val Ser Arg Asp Thr Ile Asp Tyr Leu
 210 215 220
 Leu Ser Lys Asn Gly Ser Gly Asn Ala Ile Ile Ile Val Val Gly Gly
 225 230 235 240
 Ala Ala Glu Ser Leu Ser Ser Met Pro Gly Lys Asn Ala Val Thr Leu
 245 250 255
 Arg Asn Arg Lys Gly Phe Val Lys Leu Ala Leu Arg His Gly Ala Asp
 260 265 270
 Leu Val Pro Ile Tyr Ser Phe Gly Glu Asn Glu Val Tyr Lys Gln Val
 275 280 285
 Ile Phe Glu Glu Gly Ser Trp Gly Arg Trp Val Gln Lys Lys Phe Gln
 290 295 300
 Lys Tyr Ile Gly Phe Ala Pro Cys Ile Phe His Gly Arg Gly Leu Phe
 305 310 315 320
 Ser Ser Asp Thr Trp Gly Leu Val Pro Tyr Ser Lys Pro Ile Thr Thr

```

                325                330                335
Val Val Gly Glu Pro Ile Thr Ile Pro Lys Leu Glu His Pro Thr Gln
                340                345                350
Gln Asp Ile Asp Leu Tyr His Thr Met Tyr Met Glu Ala Leu Val Lys
                355                360                365
Leu Phe Asp Lys His Lys Thr Lys Phe Gly Leu Pro Glu Thr Glu Val
                370                375                380
Leu Glu Val Asn
385

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<210> 3
<211> 1167
<212> DNA
<213> Mus musculus

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<220>
<221> misc_feature
<222> (1)...(1167)
<223> n = A,T,C or G

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ggcactggct ccagcatcct ctcagccctc caagacatct tctctgtcac ctggctcaac    180
agatcyaagg tggaaaaaca gctgcaggtc atctcagtac tacaatgggt cctatccttc    240
ctgggtgctag gagtggcctg cagtgtcatc ctcatgtaca cttctgtcac agactgctgg    300
ctgatagctg tgctctactt cacctggctg gcatttgact ggaacacgcc caagaaaggt    360
ggcaggagat cgcagtgggt gcgaaactgg gccgtgtggc gctacttccg agactacttt    420
cccatccagc tgggtgaagac acacaacctg ctgaccacca ggaactatat ctttggatac    480
cacccccatg gcatcatggg cctgggtgcc ttctgtaact tcagcacaga ggctactgaa    540
gtcagcaaga agtttctctg cataaggccc tatttggtta cgttggcygg taacttccgg    600
atgcctgtgc ttgcgcagta cctgatgtct ggaggcatct gccctgtcaa ccgagacacc    660
atagactact tgctctccaa gaatgggagt ggcaatgcta tcatcatcgt ggtgggaggt    720
gcagctgagt ccctgagctc catgcctggc aagaacgcag tcacctgaa gaaccgcaa    780
ggctttgtga agctggccct gcgccatgga gctgatctgg ttcccactta ttcctttgga    840
gagaatgagg tatacaagca ggtgatcttt gaggagggtt cctggggccg atgggtccag    900
aagaagttcc agaagtatat tggtttcgcc ccctgcactt tccatggccg aggcctcttc    960
tcctctgaca cctgggggct ggtgccctac tccaagccca tcaccaccgt cgtgggggag   1020
cccatcactg tccccaagct ggagcaccgc acccagaaag acatcgacct gtaccatgcc   1080
atgtacatgg aggccttggg gaagctcttt gacaatcaca agaccaaatt tggcctncca   1140
gagactgagg tgctggaggt gaactga
                                     1167

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<210> 4
<211> 387
<212> PRT
<213> Mus musculus

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<400> 4
Met Lys Thr Leu Ile Ala Ala Tyr Ser Gly Val Leu Arg Gly Glu Arg
  1             5             10             15
Arg Ala Glu Leu Pro Ala Ala Lys Asn Lys Asn Lys Gly Ser Ala Leu

```

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      20      25      30
Ser Arg Glu Gly Ser Gly Arg Trp Gly Thr Gly Ser Ser Ile Leu Ser
      35      40      45
Ala Leu Gln Asp Ile Phe Ser Val Thr Trp Leu Asn Arg Ser Lys Val
      50      55      60
Glu Lys Gln Leu Gln Val Ile Ser Val Leu Gln Trp Val Leu Ser Phe
65      70      75      80
Leu Val Leu Gly Val Ala Cys Ser Val Ile Leu Met Tyr Thr Phe Cys
      85      90      95
Thr Asp Cys Trp Leu Ile Ala Val Leu Tyr Phe Thr Trp Leu Ala Phe
      100      105      110
Asp Trp Asn Thr Pro Lys Lys Gly Gly Arg Arg Ser Gln Trp Val Arg
      115      120      125
Asn Trp Ala Val Trp Arg Tyr Phe Arg Asp Tyr Phe Pro Ile Gln Leu
      130      135      140
Val Lys Thr His Asn Leu Leu Thr Thr Arg Asn Tyr Ile Phe Gly Tyr
145      150      155      160
His Pro His Gly Ile Met Gly Leu Gly Ala Phe Cys Asn Phe Ser Thr
      165      170      175
Glu Ala Thr Glu Val Ser Lys Lys Phe Pro Gly Ile Arg Pro Tyr Leu
      180      185      190
Ala Thr Leu Ala Gly Asn Phe Arg Met Pro Val Leu Arg Glu Tyr Leu
      195      200      205
Met Ser Gly Gly Ile Cys Leu Val Asn Arg Asp Thr Ile Asp Tyr Leu
      210      215      220
Leu Ser Lys Asn Gly Ser Gly Asn Ala Ile Ile Ile Val Val Gly Gly
225      230      235      240
Ala Ala Glu Ser Leu Ser Ser Met Pro Gly Lys Asn Ala Val Thr Leu
      245      250      255
Lys Asn Arg Lys Gly Phe Val Lys Leu Ala Leu Arg His Gly Ala Asp
      260      265      270
Leu Val Pro Thr Tyr Ser Phe Gly Glu Asn Glu Val Tyr Lys Gln Val
      275      280      285
Ile Phe Glu Glu Gly Ser Trp Gly Arg Trp Val Lys Lys Phe Gln Lys
      290      295      300
Tyr Ile Gly Phe Ala Pro Cys Ile Phe His Gly Arg Gly Leu Phe Ser
305      310      315      320
Ser Asp Thr Trp Gly Leu Val Pro Tyr Ser Lys Pro Ile Thr Thr Val
      325      330      335
Val Gly Glu Pro Ile Thr Val Pro Lys Leu Glu His Pro Thr Gln Lys
      340      345      350
Asp Ile Asp Leu Tyr His Ala Met Tyr Met Glu Ala Leu Val Lys Leu
      355      360      365
Phe Asp Asn His Lys Thr Lys Phe Gly Leu Pro Glu Thr Glu Val Leu
      370      375      380
Glu Val Asn
385

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<210> 5

<211> 1008

<212> DNA

<213> Mus musculus

<400> 5

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atgtctggctc tgtacaacta ttggttcctt tacatcccat atctggctctg gttttactat      180
gactggagaa  ccccgagagca aggaggcaga agatggaact gggtcctaaag ctggcctgtg      240
tggaagtatt  ttaaggagta ttttccaatc tgtcttgtca aaacgcagga tttggatccg      300
ggtcacaatt  atatatattgg gtttcaccct catggaatat tcgtgcctgg agcctttgga      360
aatttttcta  caaaatactc ggacttcaag aagctatttc ctggctttac atcgtatctc      420
cacgtggcca  agatctgggtt ctgtttcccg ttgttccgag aatatctgat gagtaacggg      480
ccggtttcag  tgtctaagga gagtttgtct catgtgtctga gcaaggatgg aggtggcaat      540
gtctcaatca  ttgtcctcgg aggtgcaaag gaggcgctgg aggtcaccac aggaacattc      600
accctgtgca  tccgccagcg caaagggttt gttaagatgg ccttgaccca tgggtgccagt      660
ttggttccag  tattttcttt tgggtgaaaat gatctatata agcaaattaa caaccccaaa      720
ggctcctggc  tacgaactat acaagacgca atgtatgatt caatgggagt agccttgcca      780
ctgatatatg  ccagaggaat tttccagcac tactttggca taatgcccta tcggaagctg      840
atctacactg  ttgttggccg ccctatccct gtccagcaga ttctgaaccc gacctcagag      900
cagattgaag  agctgcacat gacataccta gaggagctaa agaaactatt caatgaacac      960
aaagggaat  atgggattcc ggagcacgaa actctggtat ttaaataa      1008

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<210> 6

<211> 335

<212> PRT

<213> Mus musculus

<400> 6

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Met Met Val Glu Phe Ala Pro Leu Asn Thr Pro Leu Ala Arg Cys Leu
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Gln Thr Ala Ala Val Leu Gln Trp Val Leu Ser Phe Leu Leu Leu Val
 20          25          30
Gln Val Cys Ile Gly Ile Met Val Met Leu Val Leu Tyr Asn Tyr Trp
 35          40          45
Phe Leu Tyr Ile Pro Tyr Leu Val Trp Phe Tyr Tyr Asp Trp Arg Thr
 50          55          60
Pro Glu Gln Gly Gly Arg Arg Trp Asn Trp Val Gln Ser Trp Pro Val
 65          70          75          80
Trp Lys Tyr Phe Lys Glu Tyr Phe Pro Ile Cys Leu Val Lys Thr Gln
 85          90          95
Asp Leu Asp Pro Gly His Asn Tyr Ile Phe Gly Phe His Pro His Gly
100          105          110
Ile Phe Val Pro Gly Ala Phe Gly Asn Phe Cys Thr Lys Tyr Ser Asp
115          120          125
Phe Lys Lys Leu Phe Pro Gly Phe Thr Ser Tyr Leu His Val Ala Lys
130          135          140
Ile Trp Phe Cys Phe Pro Leu Phe Arg Glu Tyr Leu Met Ser Asn Gly
145          150          155          160
Pro Val Ser Val Ser Lys Glu Ser Leu Ser His Val Leu Ser Lys Asp
165          170          175
Gly Gly Gly Asn Val Ser Ile Ile Val Leu Gly Gly Ala Lys Glu Ala
180          185          190

```

Leu Glu Ala His Pro Gly Thr Phe Thr Leu Cys Ile Arg Gln Arg Lys
 195 200 205
 Gly Phe Val Lys Met Ala Leu Thr His Gly Ala Ser Leu Val Pro Val
 210 215 220
 Phe Ser Phe Gly Glu Asn Asp Leu Tyr Lys Gln Ile Asn Asn Pro Lys
 225 230 235 240
 Gly Ser Trp Leu Arg Thr Ile Gln Asp Ala Met Tyr Asp Ser Met Gly
 245 250 255
 Val Ala Leu Pro Leu Ile Tyr Ala Arg Gly Ile Phe Gln His Tyr Phe
 260 265 270
 Gly Ile Met Pro Tyr Arg Lys Leu Ile Tyr Thr Val Val Gly Arg Pro
 275 280 285
 Ile Pro Val Gln Gln Ile Leu Asn Pro Thr Ser Glu Gln Ile Glu Glu
 290 295 300
 Leu His Gln Thr Tyr Leu Glu Glu Leu Lys Lys Leu Phe Asn Glu His
 305 310 315 320
 Lys Gly Lys Tyr Gly Ile Pro Glu His Glu Thr Leu Val Phe Lys
 325 330 335

<210> 7
 <211> 1129
 <212> DNA
 <213> Homo sapiens

<400> 7
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 tttgcaccgc tcaacatcca gctggcgccg cggtggccgt gctgcagtg 120
 gtcctttctt ttcttacagg gccgatgtcc attggaatca ctgtgatgct gatcatacac 180
 aactatttgt tcctttacat cccttatttg atgtggcttt actttgactg gcatacccca 240
 gagcgaggag gcaggagatc cagctggatc aaaaattgga ctctttggaa acactttaag 300
 gactattttc caattcatct tatcaaaact caagatttgg atccaagtca caactatata 360
 tttgggtttc acccccatgg aataatggca gttggagcct ttgggaattt ttctgtaaat 420
 tattctgact tcaaggacct gtttcctggc tttacttcat atcttcacgt gctgccactt 480
 tggttctggt gtctgtctt tcgagaatat gtgatgagtg ttgggctggt ttcagtttcc 540
 aagaaaagtg tgtcctacat ggtaagcaag gagggaggtg gaaacatctc tgtcattgtc 600
 cttgggggtg caaaagaatc actggatgct catcctggaa agttcactct gttcatccgc 660
 cagcggaaag gatttggtta aattgctttg acccatggcg cctctctggt cccagtgggt 720
 tcttttggtg aaaatgaact gtttaacaa actgacaacc ctgaaggatc atggattaga 780
 actgttcaga ataaactgca gaagatcatg gggtttgctt tgccctggt tcatgccagg 840
 ggagtttttc agtacaattt tggcctaagt acctatagga aagccatcca cactgttggt 900
 ggccgcccga tcctgttctg tcagactctg aacccgaccc aggagcagat tgaggagtta 960
 catcagacct atatggagga acttaggaaa ttgtttgagg aacacaaagg aaagtatggc 1020
 attccagagc acgagactct tgttttaaaa tgacttgact ataaaaaaa attaaaaaat 1080
 aaaaataaat gacttggtct taataaggca taaagaagga taagagacc 1129

<210> 8
 <211> 334
 <212> PRT
 <213> Homo sapiens

<400> 8

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Met Lys Val Glu Phe Ala Pro Leu Asn Ile Gln Leu Ala Arg Arg Leu
1      5      10      15
Gln Thr Val Ala Val Leu Gln Trp Val Leu Ser Phe Leu Thr Gly Pro
20      25      30
Met Ser Ile Gly Ile Thr Val Met Leu Ile Ile His Asn Tyr Leu Phe
35      40      45
Leu Tyr Ile Pro Tyr Leu Met Trp Leu Tyr Phe Asp Trp His Thr Pro
50      55      60
Glu Arg Gly Gly Arg Arg Ser Ser Trp Ile Lys Asn Trp Thr Leu Trp
65      70      75      80
Lys His Phe Lys Asp Tyr Phe Pro Ile His Leu Ile Lys Thr Gln Asp
85      90      95
Leu Asp Pro Ser His Asn Tyr Ile Phe Gly Phe His Pro His Gly Ile
100     105     110
Met Ala Val Gly Ala Phe Gly Asn Phe Ser Val Asn Tyr Ser Asp Phe
115     120     125
Lys Asp Leu Phe Pro Gly Phe Thr Ser Tyr Leu His Val Leu Pro Leu
130     135     140
Trp Phe Trp Cys Pro Val Phe Arg Glu Tyr Val Met Ser Val Gly Leu
145     150     155     160
Val Ser Val Ser Lys Lys Ser Val Ser Tyr Met Val Ser Lys Glu Gly
165     170     175
Gly Gly Asn Ile Ser Val Ile Val Leu Gly Gly Ala Lys Glu Ser Leu
180     185     190
Asp Ala His Pro Gly Lys Phe Thr Leu Phe Ile Arg Gln Arg Lys Gly
195     200     205
Phe Val Lys Ile Ala Leu Thr His Gly Ala Ser Leu Val Pro Val Val
210     215     220
Ser Phe Gly Glu Asn Glu Leu Phe Lys Gln Thr Asp Asn Pro Glu Gly
225     230     235     240
Ser Trp Ile Arg Thr Val Gln Asn Lys Leu Gln Lys Ile Met Gly Phe
245     250     255
Ala Leu Pro Leu Phe His Ala Arg Gly Val Phe Gln Tyr Asn Phe Gly
260     265     270
Leu Met Thr Tyr Arg Lys Ala Ile His Thr Val Val Gly Arg Pro Ile
275     280     285
Pro Val Arg Gln Thr Leu Asn Pro Thr Gln Glu Gln Ile Glu Glu Leu
290     295     300
His Gln Thr Tyr Met Glu Glu Leu Arg Lys Leu Phe Glu Glu His Lys
305     310     315     320
Gly Lys Tyr Gly Ile Pro Glu His Glu Thr Leu Val Leu Lys
325     330

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<210> 9
 <211> 435
 <212> DNA
 <213> Mus musculus

<220>
 <221> misc_feature
 <222> (1)...(435)

<223> n = A,T,C or G

<400> 9

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tgtaatttg cctattgttc acacccttgt ggccgctacc aacagtttac tttgtctggt      180
tacttctcga ctggaagact ccagataaag gtggcaggcg ttcagactgg gtacggaact      240
ggaatgtctg gaaccacatc agggactatt tccccattac aatcctgaag actaaggacc      300
tgtcaccttc agagaactac atcatggggg tccaccccat nggtctcctg accttcgggtg      360
ccttctgcaa cttctgcact gaggccacag gcttctcgaa gaccttccca ggcacactc      420
ctcacttggc cacac                                     435
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<210> 10

<211> 229

<212> PRT

<213> Mus musculus

<400> 10

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Met Lys Thr Glu His Leu Gln Ser Leu Ser Leu Leu Gln Trp Pro Leu
  1          5          10          15
Ser Tyr Val Ala Met Phe Trp Ile Val Gln Pro Leu Leu Ile Cys Leu
  20          25          30
Leu Phe Thr Pro Leu Trp Pro Leu Pro Thr Val Tyr Phe Val Trp Leu
  35          40          45
Leu Leu Asp Trp Lys Thr Pro Asp Lys Gly Gly Arg Arg Ser Asp Trp
  50          55          60
Val Arg Asn Trp Asn Val Trp Asn His Ile Arg Asp Tyr Phe Pro Ile
  65          70          75          80
Thr Ile Leu Lys Thr Lys Asp Leu Ser Pro Ser Glu Asn Tyr Ile Met
  85          90          95
Gly Val His Pro His Gly Leu Leu Thr Phe Gly Ala Phe Cys Asn Phe
  100          105          110
Cys Thr Glu Ala Thr Gly Phe Ser Lys Thr Phe Pro Gly Ile Thr Pro
  115          120          125
His Leu Ala Thr Leu Ser Trp Phe Phe Lys Ile Pro Ile Ile Arg Asp
  130          135          140
Tyr Ile Met Ala Lys Gly Leu Cys Ser Val Ser Gln Ala Ser Ile Asp
  145          150          155          160
Tyr Leu Leu Ser His Gly Thr Gly Asn Leu Val Gly Ile Pro Ile Ile
  165          170          175
Thr Val Val Gly Glu Ala Leu Pro Leu Pro Gln Val Lys Asn Pro Ser
  180          185          190
Pro Glu Ile Val Asp Lys Tyr His Ala Leu Tyr Met Asp Ala Leu Tyr
  195          200          205
Lys Leu Phe Glu Gln His Lys Val Gln Tyr Gly Cys Ser Asn Thr Gln
  210          215          220
Lys Leu Ile Phe Leu
225
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<210> 11

<211> 1240

<212> DNA
 <213> Homo sapiens

<400> 11
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 gttttgcaat ggatcccagt ctatatattt ttagtttgga tcttgccagcc attgttcgtc 180
 tacctgctgt ttacatcctt gtggccgcta ccagtgtttt actttgcctg gttgttcctg 240
 gactggaaga ccccagagcg aggtggcagg cgttcggcct gggtaaggaa ctgggtgtgtc 300
 tggaccacaca tcagggaacta tttcccatt acgatcctga agacaaagga cctatcacct 360
 gagcacaact acctcatggg gggtcacccc catggcctcc tgacctttgg cgccttctgc 420
 aacttctgca ctgaggccac aggtcttctg aagaccttcc caggcatcac tcctcacttg 480
 gccacgctgt cctggttctt caagatcccc tttgttaggg agtacctcat ggccaaaggt 540
 gtgtgctctg tgagccagcc agccatcaac tatctgctga gccatggcac tggcaacctc 600
 gtgggcattg tagtgggagg tgtgggtgag gccctgcaaa gtgtgcccac caccaccacc 660
 ctcatcctcc agaagcgcaa ggggttcgtg cgcacagccc tccagcatgg ggcatacctt 720
 gtcccttcat attcctttgg tgagaacgaa gttttcaatc aggagacctt ccctgagggc 780
 acgtgggttaa ggttggtcca aaaaaccttc caggacacat tcaaaaaaat cctgggacta 840
 aatttctgta ccttccatgg ccggggcttc actcgcgat cctggggctt cctgcctttc 900
 aatcgcccca ttaccactgt tgttggggaa ccccttccaa tcccaggat taagaggcca 960
 aaccagaaga cagtagacaa gtatcacgca ctctacatca gtgccctgcg caagctcttt 1020
 gaccaacaca aagttgaata tggcctccct gagaccacag agctgacaat tacataacag 1080
 gagccacatt ccccatgat caacccccaa agccatgagg gatccaagta gagccacaga 1140
 aaaagaagaa ttccaggaga gggaaagatc gtaaggatga gagaggagac catccaagcc 1200
 agaaattatt taataaatca gagttctagc aatagagtcc 1240

<210> 12
 <211> 335
 <212> PRT
 <213> Homo sapiens

<400> 12
 Met Ala Phe Phe Ser Arg Leu Asn Leu Gln Glu Gly Leu Gln Thr Phe
 1 5 10 15
 Phe Val Leu Gln Trp Ile Pro Val Tyr Ile Phe Leu Val Trp Ile Leu
 20 25 30
 Gln Pro Leu Phe Val Tyr Leu Leu Phe Thr Ser Leu Trp Pro Leu Pro
 35 40 45
 Val Leu Tyr Phe Ala Trp Leu Phe Leu Asp Trp Lys Thr Pro Glu Arg
 50 55 60
 Gly Gly Arg Arg Ser Ala Trp Val Arg Asn Trp Cys Val Trp Thr His
 65 70 75 80
 Ile Arg Asp Tyr Phe Pro Ile Thr Ile Leu Lys Thr Lys Asp Leu Ser
 85 90 95
 Pro Glu His Asn Tyr Leu Met Gly Val His Pro His Gly Leu Leu Thr
 100 105 110
 Phe Gly Ala Phe Cys Asn Phe Cys Thr Glu Ala Thr Gly Phe Ser Lys
 115 120 125
 Thr Phe Pro Gly Ile Thr Pro His Leu Ala Thr Leu Ser Trp Phe Phe
 130 135 140
 Lys Ile Pro Phe Val Arg Glu Tyr Leu Met Ala Lys Gly Val Cys Ser


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cctcagagaa tatgtaatgt ctacaggggc ctgctctgtg agtcgatacct ccattgactt 1320
tctgctgact cataaaggca caggcaacat ggtcattgtg gtgattgggtg gactggctga 1380
gtgcagatac agcctgccag gttctttctac cctgggtgttg aagaaccggt ctggctttgt 1440
gcgcattggcc cttcagcatg gggtgccctct aataacctgcc tatgcctttg gggagacgga 1500
cctctatgat cagcacatct tcaactcctgg tggctttgtc aaccgcttcc agaagtgggt 1560
ccagagcatg gtacacatct acccttgtgc tttctatgga cgtggcttca ccaagaactc 1620
ctggggcctt ctgccctata gtcggcctgt aaccaccatc gtcggggagc ctctaccaat 1680
gccaagatt gagaatccaa gccaggagat cgtgggctaaa tatcacacac tctatattga 1740
tgccctacgt aaactgtttg accagcataa gaccaagttt ggtatctcag agaccagga 1800
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gaccagtga ga 1872

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<210> 14
<211> 333
<212> PRT
<213> Homo sapiens

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Ala Val Phe Gln Trp Ser Phe Ser Ala Leu Leu Ile Thr Thr Thr Val
          20             25             30
Ile Ala Val Asn Leu Tyr Leu Val Val Phe Thr Pro Tyr Trp Pro Val
          35             40             45
Thr Val Leu Ile Leu Thr Trp Leu Ala Phe Asp Trp Lys Thr Pro Gln
          50             55             60
Arg Gly Gly Arg Arg Phe Thr Cys Val Arg His Trp Arg Leu Trp Lys
          65             70             75             80
His Tyr Ser Asp Tyr Phe Pro Leu Lys Leu Leu Lys Thr His Asp Ile
          85             90             95
Cys Pro Ser Arg Asn Tyr Ile Leu Val Cys His Pro His Gly Leu Phe
          100            105            110
Ala His Gly Trp Phe Gly His Phe Ala Thr Glu Ala Ser Gly Phe Ser
          115            120            125
Lys Ile Phe Pro Gly Ile Thr Pro Tyr Ile Leu Thr Leu Gly Ala Phe
          130            135            140
Phe Trp Met Pro Phe Leu Arg Glu Tyr Val Met Ser Thr Gly Ala Cys
          145            150            155            160
Ser Val Ser Arg Ser Ser Ile Asp Phe Leu Leu Thr His Lys Gly Thr
          165            170            175
Gly Asn Met Val Ile Val Val Ile Gly Gly Leu Ala Glu Cys Arg Tyr
          180            185            190
Ser Leu Pro Gly Ser Ser Thr Leu Val Leu Lys Asn Arg Ser Gly Phe
          195            200            205
Val Arg Met Ala Leu Gln His Gly Val Pro Leu Ile Pro Ala Tyr Ala
          210            215            220
Phe Gly Glu Thr Asp Leu Tyr Asp Gln His Ile Phe Thr Pro Gly Gly
          225            230            235            240
Phe Val Asn Arg Phe Gln Lys Trp Phe Gln Ser Met Val His Ile Tyr
          245            250            255
Pro Cys Ala Phe Tyr Gly Arg Gly Phe Thr Lys Asn Ser Trp Gly Leu

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[illegible]

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ttctccttct	tggcactggg	taagatctgc	actgtgggct	tcatagccct	cctgtttaca	180
agattctggc	tcctcactgt	cctgtatgcg	gcctggtggt	atctggaccg	agacaagcca	240
cggcaggggg	gccggcacat	ccaggccatc	aggtgctgga	ctatatggaa	gtacatgaag	300
gactatttcc	ccatccagct	ggtcaagact	gctgagctgg	acccctctcg	gaactacatt	360
gcgggcttcc	acccccatgg	agtcctggca	gtcggagcct	ttgccaacct	gtgcactgag	420
agcacaggct	tctcttcgat	cttccccggg	atccgcccc	atctgatgat	gctgaccttg	480
tggttccggg	cccccttctt	cagagattac	atcatgtctg	cagggttggt	cacatcagaa	540
aaggagagtg	ctgctcacat	tctgaacagg	aagggtggcg	gaaacttgct	gggcatcatt	600
gtagggggtg	cccaggaggc	cctggatgcc	aggcctggat	ccttcacgct	gttactggcg	660
aaccgaaaag	gcttcgtcag	gctcgccctg	acacacgggg	caccctgggt	gccaatcttc	720
tccttcgggg	agaatgacct	atttgaccag	attcccaact	cttctggctc	ctggttacgc	780
tatatccaga	atcggttgca	gaagatcatg	ggcatctccc	tcccactctt	tcatggcgt	840
ggtgtcttcc	agtacagctt	tggtttaata	ccctaccgcc	ggcccatcac	cactgtgggg	900
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cagcattata	tcaaagagct	gtgcaacctc	ttcgaggccc	acaaaacttaa	gttcaacatc	1020
cctgctgacc	agcacttqqa	qttctqctga				1050

<400> 16															
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1				5					10					15	
Thr	Leu	Ala	Val	Leu	Gln	Phe	Val	Phe	Ser	Phe	Leu	Ala	Leu	Gly	Lys
			20					25					30		
Ile	Cys	Thr	Val	Gly	Phe	Ile	Ala	Leu	Leu	Phe	Thr	Arg	Phe	Trp	Leu
		35					40					45			
Leu	Thr	Val	Leu	Tyr	Ala	Ala	Trp	Trp	Tyr	Leu	Asp	Arg	Asp	Lys	Pro
	50					55					60				
Arg	Gln	Gly	Gly	Arg	His	Ile	Gln	Ala	Ile	Arg	Cys	Trp	Thr	Ile	Trp
65					70					75					80

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Lys Tyr Met Lys Asp Tyr Phe Pro Ile Gln Leu Val Lys Thr Ala Glu
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Leu Asp Pro Ser Arg Asn Tyr Ile Ala Gly Phe His Pro His Gly Val
      100                    105                    110
Leu Ala Val Gly Ala Phe Ala Asn Leu Cys Thr Glu Ser Thr Gly Phe
      115                    120                    125
Ser Ser Ile Phe Pro Gly Ile Arg Pro His Leu Met Met Leu Thr Leu
      130                    135                    140
Trp Phe Arg Ala Pro Phe Phe Arg Asp Tyr Ile Met Ser Ala Gly Leu
      145                    150                    155                    160
Val Thr Ser Glu Lys Glu Ser Ala Ala His Ile Leu Asn Arg Lys Gly
      165                    170                    175
Gly Gly Asn Leu Leu Gly Ile Ile Val Gly Gly Ala Gln Glu Ala Leu
      180                    185                    190
Asp Ala Arg Pro Gly Ser Phe Thr Leu Leu Leu Arg Asn Arg Lys Gly
      195                    200                    205
Phe Val Arg Leu Ala Leu Thr His Gly Ala Pro Leu Val Pro Ile Phe
      210                    215                    220
Ser Phe Gly Glu Asn Asp Leu Phe Asp Gln Ile Pro Asn Ser Ser Gly
      225                    230                    235                    240
Ser Trp Leu Arg Tyr Ile Gln Asn Arg Leu Gln Lys Ile Met Gly Ile
      245                    250                    255
Ser Leu Pro Leu Phe His Gly Arg Gly Val Phe Gln Tyr Ser Phe Gly
      260                    265                    270
Leu Ile Pro Tyr Arg Arg Pro Ile Thr Thr Val Gly Lys Pro Ile Glu
      275                    280                    285
Val Gln Lys Thr Leu His Pro Ser Glu Glu Glu Val Asn Gln Leu His
      290                    295                    300
Gln His Tyr Ile Lys Glu Leu Cys Asn Leu Phe Glu Ala His Lys Leu
      305                    310                    315                    320
Lys Phe Asn Ile Pro Ala Asp Gln His Leu Glu Phe Cys
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<210> 17
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 <213> Artificial Sequence

<220>
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<210> 18
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 <212> DNA
 <213> Homo sapiens

<400> 18

